From:	McCarter, Jennifer
To:	Bailley, Treasure; Jacobson, Linda; Churchill, Stephen; jill.parisi
Cc:	Reeves, Molly; Munoz, Emily; Kilty, Quinn V; Rohr, Matthew; Bodry, Renee A; Ruch, James E; Johnston, Christine E; Morrison, Kendra
Subject:	RE: Comanche Phased Drill Plan
Date:	Wednesday, July 29, 2020 3:42:12 PM
Attachments:	ATT00001.txt

Thank you Treasure, we understand that your review was preliminary, and appreciate you sharing the information!

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From: Bailley, Treasure <Bailley.Treasure@epa.gov>
Sent: Wednesday, July 29, 2020 1:00 PM
To: McCarter, Jennifer <jennifer.mccarter@xcelenergy.com>; Jacobson, Linda <Jacobson.Linda@epa.gov>; Churchill, Stephen <Churchill.Stephen@epa.gov>; jill.parisi <jill.parisi@state.co.us>
Cc: Reeves, Molly <Molly.Reeves@hdrinc.com>; Munoz, Emily <Emily.Munoz@hdrinc.com>; Kilty, Quinn V <quinn.v.kilty@xcelenergy.com>; Rohr, Matthew <Matthew.Rohr@hdrinc.com>; Bodry, Renee A <Renee.A.Bodry@xcelenergy.com>; Ruch, James E <James.E.Ruch@xcelenergy.com>; Johnston, Christine E <Christine.Johnston@XCELENERGY.COM>; Morrison, Kendra <Morrison.Kendra@epa.gov>
Subject: RE: Comanche Phased Drill Plan

Hi Jennifer,
Thank you for your quick response and the clarifications. We appreciate it.
The following links ***should*** take you to the DWR page with the information for the three domestic wells to the south:
https://dwr.state.co.us/Tools/WellPermits/3672171
https://dwr.state.co.us/Tools/WellPermits/9096251
https://dwr.state.co.us/Tools/WellPermits/0275816B
When we spoke earlier (I don't remember if this was Monday's conversation, or earlier this month) I mentioned that these three wells were those that I confirmed that the locations "made sense". That's not to say that they plot exactly at the location of the well, but that there is a nearby structure/home, or, in one case, what appears to be a livestock waterer, based on Google Earth review. The state database locations aren't exact and would need to be field-checked. I did not attempt to correct the locations. These wells are all completed into "blue shale," which I interpreted as likely the upper Pierre Shale transition member, described as "olive-gray bentonitic silty noncalcareous shale" (Scott, 1969). I agree that a thorough review that includes field checking the locations and confirming the geology of these wells in concert with the on-site investigation would

assist in determining the need for additional wells.
Note that there were additional wells in the DWR database that plot nearby, but Google Earth review showed no indication of any development; those wells were excluded from my review. And of course there are a handful of domestic wells off to the northeast, which I think we all anticipate being up-gradient of the facility. If that turns out to be incorrect, I guess that will be another discussion.
I hope that information helps.
Treasure

From: McCarter, Jennifer <jennifer.mccarter@xcelenergy.com>
Sent: Wednesday, July 29, 2020 9:47 AM
To: Bailley, Treasure <Bailley.Treasure@epa.gov>; Jacobson, Linda <Jacobson.Linda@epa.gov>; Churchill, Stephen <Churchill.Stephen@epa.gov>; jill.parisi <jill.parisi@state.co.us>
Cc: Reeves, Molly <Molly.Reeves@hdrinc.com>; Munoz, Emily <Emily.Munoz@hdrinc.com>; Kilty, Quinn V <quinn.v.kilty@xcelenergy.com>; Rohr, Matthew <Matthew.Rohr@hdrinc.com>; Bodry, Renee A <Renee.A.Bodry@xcelenergy.com>; Ruch, James E <James.E.Ruch@xcelenergy.com>; Johnston, Christine E <Christine.Johnston@XCELENERGY.COM>; Morrison, Kendra <Morrison.Kendra@epa.gov>
Subject: Comanche Phased Drill Plan

Hello Treasure,
Thank you for providing your written comments and notes from our call Monday. We also thought the discussion was productive, and we understand EPA's perspective regarding your comments and suggestions. We are committed to working with EPA and CDPHE to complete a hydrogeologic investigation that provides the data necessary to further understand the site conceptual model and evaluate potential for connectivity between the site and off-site wells. We view this current work scope as a first step in meeting those objectives; with initial focus on more fully understanding site conditions, including water elevations and potential flow direction, which are important for locating any additional borings. After compilation of the data from this field effort, we expect to have follow up discussions with EPA and CDPHE to review the results and discuss appropriate next steps in the overall hydrogeologic investigation, which can include better informed decisions about additional data needs.
Regarding the off-site wells, we are reviewing well records on the State Engineer's Office website, and have identified several off-site wells screened in alluvium or colluvium, but have not yet identified wells that EPA has referenced located in an upland location and/or screened in bedrock. Would you mind sharing with us the well records (or permit numbers) that you have identified and have been referencing so that we all are working from the same data set?
Please see our additional thoughts below, and revisions in attached documents.
We look forward to meeting you tomorrow and working with you on this program.

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From: Bailley, Treasure <Bailley.Treasure@epa.gov>
Sent: Tuesday, July 28, 2020 11:41 AM

To: McCarter, Jennifer <jennifer.mccarter@xcelenergy.com>; Jacobson, Linda <Jacobson.Linda@epa.gov>; Churchill, Stephen <Churchill.Stephen@epa.gov>; jill.parisi <jill.parisi@state.co.us>; Reeves, Molly <Molly.Reeves@hdrinc.com>; Munoz, Emily <Emily.Munoz@hdrinc.com>; Kilty, Quinn V <quinn.v.kilty@xcelenergy.com>; Morrison, Kendra <Morrison.Kendra@epa.gov>

Subject: RE: Comanche hydrogeo work scope discussion

Hello Jennifer and all,

Thank you again for taking the time to chat yesterday, and walking through the hydrogeo Scope of Work with us. We found the discussion very helpful and appreciate everyone's participation. Please find below EPA's combined comments and notes for confirmation/clarification/consideration of the Comanche hydrogeo Scope of Work based on that discussion. We understand the need for flexibility in the schedule and decision making and want to make sure that we all understand how those decisions will be made and what they are based on. Please feel free to provide any follow-up thoughts or comments.

While not detailed in the Scope of Work (SOW), it is our understanding from the call on Monday that for the purposes of any on-site decisions related to well completion (e.g., p. 5 of SOW), if *any* fractures are identified at the time of drilling, that constitutes a "fracture zone" and "few or no fractures" means *no* fractures were identified.

We agree with this clarification and have made minor edits to Section 2 of the drill plan to clarify identification of fractured vs unfractured bedrock. Additionally, upon review of this section, we think it is appropriate to modify the fourth bullet of the objectives, consistent with an overall phased approach to the hydrogeologic characterization. It is not our intent that this be a single field effort that will attempt to address all questions and data needs, and we recognize that a subsequent phase of work may be necessary.

Our preference for wells observed to be "dry" and "not fractured" at the time of drilling is placement of a temporary well, rather than abandoning the borehole at the time of drilling. It would be helpful if Xcel could also provide SOPs or references for temporary well construction and how these wells will be abandoned if they are ultimately not completed.

We have included in the attached revised Drill Plan, placement of temporary wells in borings that are dry and not fractured to evaluate borings prior to deciding whether to construct a permanent well or abandon the boring. It is our intent that the decision whether to convert to a permanent well or abandon the boring will be made during the course of this field effort. Construction details of temporary wells, conversion to permanent wells and well abandonment are also included.

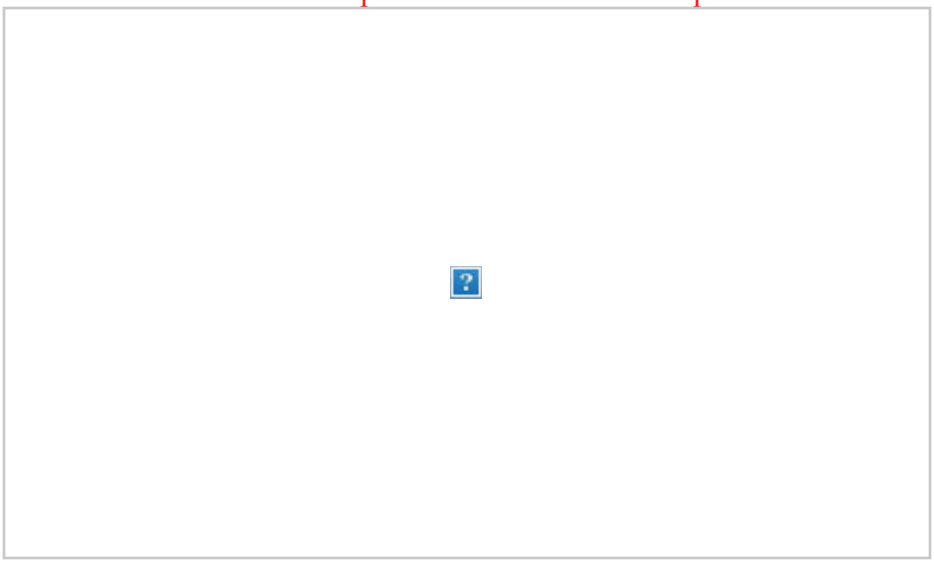
We generally agree with the described phased approach to drilling. However, note that W-2 is northeast of and very near where the Pierre Shale outcrops at the surface (see geologic map, attached) and anticipate that the near-surface geology here may be different than west of the outcrop/facility, specifically MW-4 (~1 mile between MW-4 and W-2). It appears from the SOW (p. 5) that if no fracturing is observed in the bedrock at W-2B or the perimeter wells, then the western wells will not be deepened. Considering bedrock is at/near surface near W-2 and may be 50' or more below surface on the western side of the facility (e.g., Woodward-Clyde 1987), we think basing the decision regarding deepening western wells based solely on dryness and degree of fracturing of the perimeter wells warrants additional consideration.

We have included in the Drill Plan an incremental approach to deepening the wells at the landfill, even if the boring at W-2B is competent and dry; beginning with MW-2, then MW-4.

However, if all three of these borings and the two eastern perimeter borings are competent and dry, we don't see value in deepening MW-1.

We would also appreciate Xcel considering the possibility of an additional well to the south of the raw water storage area to assess the potential for impacts to local domestic wells and/or an investigation into the potential for groundwater at domestic wells to communicate with groundwater at the Site. We think it would be appropriate to consider whether or not an additional well may be warranted as information is gained from the existing project and any additional research based on the location and elevation of these wells. For instance, the three private wells to the ~south of the facility have completion depths that range from 34'-75', with static water levels varying from ~19'-45'. Using Google Earth to ESTIMATE elevations, the surface elevations of these wells appear to range from ~4870'-4765', with the St. Charles River ~4750'-4725' in the area of the domestic wells, and the southeast corner of the Comanche facility is ~4800' (as you know, elevation on-site varies). These (unconfirmed) elevation estimates do not preclude communication between groundwater at the Comanche site and that of the domestic wells. Confirmation of well location & elevation would assist an evaluation of the relationship between groundwater at Comanche, the domestic wells, and the St. Charles River.

We agree that the observations and suggestions provided by EPA are valuable in evaluating potential off-site migration, but think first it is critical to have fully evaluated the results from this initial effort, and the off-site well data, to determine additional data needs and boring locations, rather than making decisions beyond the current scope based solely on initial field observations. We are committed to discussing this further with EPA when we review the results of this first work scope and the need for subsequent field work.



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